

Rocky Mountain Research Station Science You Can Use *(in 5 minutes)*

SEPTEMBER 2019



In the Pipeline: A New Report on the Effects of Oil and Gas Development on the Biggest National Grassland

Recent advances in horizontal drilling and hydraulic fracturing (since 2000) have greatly increased oil and gas development in the West. In a new General Technical Report ([RMRS-GTR-384](#)) titled Biological Assessment of Oil and Gas Development on the Little Missouri National Grassland, scientists describe the actual and potential effects of oil and gas development on the largest designated National Grassland in the United States located in western North Dakota. Written by Rocky Mountain Research Station Ecologists Jack Butler (emeritus scientist), Jacqueline Ott and collaborators, the GTR focuses on the effects of oil and gas development on soils, vegetation, and wildlife.



Recent advances in horizontal drilling and hydraulic fracturing have greatly increased oil and gas development on grasslands like the Little Missouri National Grassland (pictured here), and so natural resource managers need to have the latest science on the impacts of this activity. A newly published GTR provides the latest science on impacts of this activity on grassland systems (photo by J. Dekker, USDA Forest Service).

MANAGEMENT IMPLICATIONS

- Recent advances in horizontal drilling and hydraulic fracturing have greatly increased oil and gas development on the Little Missouri National Grassland. Natural resource managers need to have ready access to the latest science on the consequences of and issues around oil and gas development.
- This report summarizes the latest science on actual and potential effects of oil and gas development on soils, vegetation, and wildlife. It compiles the results of studies that are particularly pertinent to Little Missouri National Grassland but also to other grasslands, and is focused mainly on songbirds, grouse, ungulates, and aquatic communities.
- Management concerns regarding three threatened species or species of concern — the Dakota Skipper (a butterfly), Sprague's Pipit (a songbird), and the Northern Long-Eared Bat — are covered extensively in the document.

Grassland managers across the Great Plains will find this an especially useful resource because it provides information specific to grassland systems, particularly grasslands in the northern Great Plains. According to Ott, "Our goal was to provide an overview and summary that provides a broad background useful to all grassland managers as a reference and starting place to help identify and address potential outcomes. Finding opportunities to mitigate oil and gas development effects requires a solid understanding of the potential impacts."

Three threatened species or species of concern—the Dakota Skipper (a butterfly), Sprague's Pipit (a songbird), and the Northern Long-Eared Bat—are covered extensively in the report.



One highly relevant aspect of the report for grassland managers is the synthesis of current literature describing the known direct outcomes of oil and gas development for the biological resources of the area and to other grasslands. For example, the construction of oil well pads, roads, and pipelines removes the surface vegetation and mixes upper soil layers. Restoration efforts are often required on two separate occasions: (1) early on, when the site is complete, and the construction footprint is reduced to its operating footprint, and (2) at the end of the project when infrastructure is completely removed at the completion of oil extraction. The report points out that well-site reclamation almost always benefits from using organic amendments, which have a very positive effect on soil biological activity. However, a potential tradeoff is that the use of these amendments may introduce invasive plants to the area.

Oil and gas development also affects wildlife, mainly through habitat loss and fragmentation, direct mortality (for example, animals being hit by vehicles), and behavioral changes. The report compiles the results of studies pertinent to Little Missouri National Grassland, focused mainly on songbirds, grouse, ungulates, and aquatic communities. An example of one pattern that emerged for endemic grassland songbirds (Baird's sparrow, chestnut-collared longspur, McCown's longspur, and Sprague's pipit) was that their abundance and reproductive success in the Great Plains were more consistently negatively affected by nearby oil and gas infrastructure than more widespread species. For pronghorn, the report describes the difficulty of measuring habitat selection in the presence of oil wells because these wells tend to be situated in areas of high-quality pronghorn habitat. Fragmentation of these high-value habitats by well pads and roads may in part explain why pronghorns in North Dakota have decreased with the rise in oil and gas development.

Because the effects of oil and gas development on grasslands are complex, the authors put together this GTR with the goals of: (1) summarizing the latest science to help inform management on current and potential issues, (2) providing a ready reference for experienced as well as new managers on the National Grassland, and (3) fostering lines of communication between scientists and managers so that research results can be incorporated quickly into management plans.

Overview of *Biological Assessment of Oil and Gas Development on the Little Missouri National Grassland*

- Oil and Gas Development
 - *Background of oil and gas development on Little Missouri National Grassland*
 - *Projected biological effects during oil and gas development*
- Specific Impacts Resulting From Oil and Gas Development
- Threatened Species
- Ongoing Research in North Dakota / Other Resources

Jacqueline Ott is a Research Ecologist with the Rocky Mountain Research Station in Rapid City, South Dakota. Her current research focuses on understanding the role of vegetative reproduction in grassland response to disturbance and invasive species.

Jack Butler is a Scientist Emeritus with the Rocky Mountain Research Station in Rapid City, South Dakota. His research focuses on the ecology and management of the vegetation associated with the grasslands, shrublands, woodlands, and forests of the Northern Great Plains.



The Little Missouri National Grassland in western North Dakota is the largest designated National Grassland in the United States. (Photo by J. Dekker, USDA Forest Service).

Forest Service Research and Development (FS R&D) works with partners to deliver the knowledge and tools that land managers need to sustain the health, diversity, and productivity of our Nation's forests and grasslands for present and future generations. The Rocky Mountain Research Station (RMRS) is one of seven FS R&D units, rooted in the geography of the Interior West, and integrated into a national program with global applications. RMRS science improves lives and landscapes. More information about Forest Service research in the Rocky Mountain Region can be found here: <https://www.fs.fed.us/rmrs/>



Subscribe online to future Science You Can Use editions at <https://www.fs.fed.us/rmrs/science-you-can-use-bulletin>

